Fact Sheet
August 2003

EXPLANATION OF SIGNIFICANT DIFFERENCES FOR THE REMEDIAL ACTION PLAN, COAST WOOD PRESERVING SITE
Ukiah, California

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

DTSC is one of six Boards and Departments within the California Environmental Protection Agency. The Department's mission is to restore, protect and enhance the environment, to ensure public health, environmental quality and economic vitality, by regulating hazardous waste, conducting and overseeing cleanups, and developing and promoting pollution prevention.

State of California

California Environmental Protection Agency

INTRODUCTION

The California Environmental Protection Agency, **Department of Toxic Substances Control (DTSC)** is issuing this fact sheet to inform the community about significant changes to the **Remedial Action Plan (RAP)** for the **Coast Wood Preserving Site** (Site). **DTSC** approved the **RAP** in September 1989 and a **RAP** Amendment in July 1999. The changes to the **RAP** include revision of the soil cleanup levels and modification of the scope and timing of soil cleanup. Additionally, this fact sheet satisfies requirements in Federal law that an **Explanation of Significant Differences (ESD)** be published by a lead agency when significant changes in the scope, performance, or cost of cleanup actions adopted in a remedy selection document occur, but do not fundamentally alter the selected remedy. This **ESD** will become part of the Administrative Record for the cleanup decision of the Site.

DTSC has been the lead agency overseeing the investigation and cleanup of hazardous substances releases at the Site. The **U.S. Environmental Protection Agency (U.S. EPA)**, Region IX listed the Site on the National Priorities List in 1983 and continues to work with **DTSC** as a support agency, along with the **California Regional Water Quality Control Board, North Coast Region (RWQCB)**.

The **RAP** primarily documented the inclusion of interim measures, designed to prevent migration of ground-water contamination, as part of the Site remedy. Additional measures, involving ***in-situ*** **reduction and fixation** of **hexavalent chromium**, were incorporated as part of the remedy through the **RAP** Amendment and have resulted in a significant decrease in the level of ground-water contamination. The **RAP** anticipated that soil cleanup would not be undertaken until the cessation of wood-preservation activities at the Site, but **Coast Wood Preserving Inc. (CWP)** has proposed that some accessible contaminated soil can be remediated while the plant is operational.

The **RAP** established soil cleanup goals for **arsenic** and total **chromium** of 15 **mg/kg** and 100 **mg/kg**, respectively. Limited background soil sampling was used as the basis for setting these cleanup levels. This **ESD** documents the establishment of risk-based soil cleanup levels for **arsenic** and **hexavalent chromium**. The **arsenic** goal is based on a commercial / industrial setting with on-site workers and on a health risk of 10^{-5}. The cleanup goal for hexavalent **chromium** in soil is based on

preventing exceedance of the California Maximum Contaminant Level (MCL) in ground-water through the potential leaching of **chromium** from soil. Additionally, the **ESD** documents the change in the timing of the soil cleanup and how soil cleanup will be conducted. A more detailed discussion of the specific changes that are being made to the **RAP** is presented in the "Basis For and Description of Significant Differences" section of this Fact Sheet.

SITE HISTORY AND CONTAMINATION

CWP has operated a wood-preserving facility at the intersection of Taylor and Plant Roads in Ukiah, California, since 1971. **CWP** has used wood-preserving solutions containing **copper**, **chromium**, and **arsenic**. In January 1972, concerns were raised by Mendocino County and California Department of Fish and Game personnel about the possible discharge of preserving solutions from the Site *via* runoff of rainwater into the Russian River. **RWQCB** issued **CWP** orders in 1972 to implement measures to keep the preserving solutions contained on the Site. **CWP** complied with the orders by paving the Site and constructing a slurry wall to contain the **chromium**-impacted ground-water. Between 1981 and 1984, a series of investigations were conducted by **CWP**'s consultants to investigate the release of preserving solutions to soil and ground-water. Based on the investigation data, a **RAP** was prepared and approved by **DTSC** on September 29, 1989. A Covenant and Agreement was filed with the Mendocino County Recorder on November 29, 1989 to restrict the use of the property to industrial use only.

CWP subsequently submitted a "Proposed Amendment to the Remedial Action Plan" (Montgomery Watson, May 1999), which proposed enhancements to the remedial program for ground-water contamination at the site, utilizing an innovative ***in-situ*** **reduction and fixation** approach. Under the Amendment, chemical reductant solution was injected through a grid of injection points, under pressure, to react with the mobile **hexavalent chromium** and reduce it to the low-solubility **trivalent** form of **chromium**, the form in which **chromium** naturally occurs. This **RAP** amendment was approved by **DTSC** in July 1999.

SELECTED REMEDY

The **RAP** approved by **DTSC** in September 29, 1989 primarily focused on the prevention of further contamination of surface runoff and the containment of ground-water contamination. The **RAP** included the following components:

- Surface runoff management,
- Control of contaminated soil,
- Ground-water contamination control and remediation by pumping,
- Electrochemical treatment of pumped ground-water,
- Treated water recycling/discharge to the Ukiah Sewage Treatment Plant or reinjection on site, and
- Surface water and ground-water monitoring.

A qualitative risk assessment contained in the **RAP** concluded that because of the surface paving there was no direct exposure to soil contamination and assumed that soil remediation would be conducted upon cessation of wood-preservation activities at the Site. The assumed method of remediation was to be on-site treatment of the contaminated soil containing 100 milligrams per kilogram (**mg/kg**) total **chromium** and 15 **mg/kg arsenic**.

The Amendment to the **RAP** centered on the treatment of ground-water contamination by the high-pressure injection of reductant solution on a grid basis, through a series of temporary injection points. These points of injection were withdrawn

and sealed upon injection of the reductant. When possible, the injections were conducted during periods of high ground-water levels, to allow for contact of reductant solution with **hexavalent chromium** contained in fluids in the normally unsaturated soil in the zone of ground-water fluctuation. The Amendment also proposed installing infiltration galleries in the areas with high soil **chromium** concentration. These galleries would be constructed by trenching to about 3 feet below ground surface, backfilling the trenches with permeable material, and infiltrating reductance into the vandose zone. The **RAP** amendment also recognizes that it is technically impractical to install these infiltration galleries into the active operations areas such as in the existing treatment cylinders or building structures.

BASIS FOR DESCRIPTION OF SIGNIFICANT DIFFERENCES

Cleanup Goals

The **RAP** established soil cleanup goals for **arsenic** and total **chromium** of 15 **mg/kg** and 100 **mg/kg**, respectively. Limited background soil sampling was used as the basis for setting these cleanup levels. Risk-based soil cleanup levels were developed as part of a risk-based site assessment commissioned by **CWP**. As a result, a "Risk-Based Cleanup Level Development Report" (Montgomery Watson Harza, February 19, 2002) was prepared in consultation with toxicological personnel of **DTSC**, utilizing recent soil sampling data and changes in risk assessment methodology made since the date of the **RAP** preparation. **DTSC** subsequently approved soil cleanup goals of 27 **mg/kg** for **arsenic** and 42 **mg/kg** for **hexavalent chromium**, in a letter dated March 27, 2002. The **arsenic** goal is based on a commercial / industrial setting with on-site workers and on a health risk of 10^{-5}. The **hexavalent chromium** goal is based on preventing exceedance of the MCL in ground-water through the potential leaching of **chromium** from soil. These cleanup goals will be utilized in the remediation of accessible soil during plant operation. They will also be the controlling values for the future remediation of that portion of the soil not now accessible for remediation, for example the soil under the treatment cylinders and regulatory E.P.A. Subpart W drip pad. Drip pad regulations are contained in 40 CFR 265.440, Appendix C.

Arsenic- **Arsenic** is a widely occurring (twentieth most common element) metalloid with highly variable geochemical behavior, depending on the valence state in which it occurs. Because of the geochemical behavior of **arsenic**, the goal was established on the basis of the total concentration. Under oxidized conditions, **arsenic** occurs in the pentavalent form as a complex **oxy-anion**, and reacts with ferric iron to form a low-solubility ferric hydroxide / ferric arsenate precipitate. The absence of dissolved **arsenic** in ground-water in the immediate proximity to elevated soil concentrations of **arsenic** at areas such as near monitor well **CWP**-114 is an indication that much of the **arsenic** present in the soil is in the form of such low-solubility material. Under highly reduced conditions, **arsenic** reacts with iron and sulfur to form sulfide minerals such as arsenopyrite. Under slightly reduced conditions, **arsenic** becomes soluble as the **oxy-anion** arsenite. Such behavior has been noted during the **in-situ reduction** of **hexavalent chromium** in the on-going ground-water remediation at the site, but is expected to be a temporary condition.

The "Risk-Based Cleanup Level Development Report" (Montgomery Watson Harza, February 19, 2002) follows regulatory protocols and provides the justification for considering a site-specific, health-protective, risk-based cleanup goal. The cleanup goal for **arsenic** of 27 **mg/kg** differs from the previously established background value of 15 **mg/kg**, in that it is based on a quantitative evaluation of potential human health risks as summarized below. Consistent with the deed restriction placed on the Site in 1989, the risk evaluation assumes exposures to and develops a health-protective risk-based **arsenic** cleanup level

for current and future on-site commercial/industrial workers. The deed restriction limits include:

- Restrictions from development of hospitals, schools, day-care centers, and residential use;
- Maintenance of a asphalt or concrete cap over the property; and
- Restrictions on any proposed earth work or other activities that may disturb the cap (e.g. DTSC notification, dust control, handling of materials pursuant to hazardous waste regulations).

The cleanup goal for **arsenic** of 27 **mg/kg** conservatively assumes direct contact with site soils, even though the deed restriction requiring surface paving will protect against direct exposures. The **arsenic** cleanup goal of 27 **mg/kg** is below 440 **mg/kg** corresponding to a Health Index of 1 for on-site workers that would be protective of non-cancer health effects. The **arsenic** cleanup goal is also within the range of 2.7 – 270 **mg/kg** that would be protective of the 10^{-6} to 10^{-4} acceptable cancer risk range.

Chromium- **Chromium** is also highly variable in its behavior in the subsurface, depending on the valence state in which it occurs. Naturally occurring **chromium** is in the reduced **trivalent** state, and is known as a trace element needed for life. **Hexavalent chromium** is a toxic **oxy-anion**, which is highly mobile under normal geochemical regimes. The prior **in-situ reduction** efforts in the ground-water at the Site have demonstrated the ability to reduce the **hexavalent chromium** to the **trivalent** form by the addition of ferrous iron or reduced sulfur reagents. The cleanup goal is for the mobile, toxic **hexavalent** form of **chromium**, in contrast to the original goal of 100 **mg/kg** total **chromium**, which failed to distinguish between the toxic and non-toxic forms of the element.

Remedial Timing

As previously noted, the **RAP** did not anticipate remediation of soil contamination until closure of the **CWP** facility. However, **CWP** has proposed to **DTSC** that soil remediation be performed in those portions of the plant which are accessible, while the plant is operational, rather than waiting until the end of plant operation. Soil remediation would be conducted by **CWP** personnel and contractors, trained for such activities, as appropriate, with oversight from Montgomery Watson Harza (**MWH**) personnel. In this way, the remediation can proceed in a more timely fashion, while **CWP** personnel are available to aid in the efforts. It would also help reduce further contamination of ground-water that could occur when the water table rises to a high level.

Soil sampling, to a depth of 4 feet, was conducted within accessible areas south of the wood treatment facility during December, 2002 and January, 2003, in accordance with a DTSC-approved work plan. Laboratory results were used to define areas requiring deeper soil sampling, which was conducted during March, 2003. The results were then presented in a June 18, 2003 **MWH** report "Results of Accessible Soil Sampling for **Chromium** and **Arsenic** Contamination at the Coast Wood Preserving Facility, Ukiah, CA" and will be used in planning soil remediation. A remedial design work plan was submitted to DTSC in July, 2003, and soil remediation will be conducted beginning in the summer of 2003 and will be completed prior to the onset of the autumn rainy season, to allow for pavement replacement before runoff is likely to occur.

Changes to Remedial Actions

Results of soil sampling indicate that there are only two 10-foot by 10-foot areas (in the overall area where soil remediation is to occur) that are solely contaminated with **hexavalent chromium** over the cleanup goal, and further indicate that there is very little soil above the **hexavalent chromium** cleanup goal. Therefore, the soil cleanup is largely being driven by soil that exceeds the total **arsenic** concentration goal.

The soil cleanup for **arsenic** is based on total **arsenic** concentration, and hence cannot be remediated by use of **in-situ** techniques, which change the valence state, and mobility of the **arsenic**. Rather, soil contaminated with **arsenic** will be remediated by excavation and disposal offsite at a permitted facility. It is recognized that the presence of **hexavalent chromium** residual in the interstitial moisture has the opportunity to migrate to the ground-water, even though it is below the **hexavalent chromium** cleanup goal. To further minimize such potential migration, the bottom of the excavated areas will be treated with calcium polysulfide reductant, the same reagent previously used in the **in-situ** remediation of the ground-water, to convert a portion of the **hexavalent chromium** to the immobile **trivalent** form.

The proposed change is not expected to result in a significant change in the total cost of remediation, since it merely involves a change in timing of the remediation effort, from after plant closure to while the plant is still in operation. It does allow the remediation to be achieved while plant personnel are still on site, thereby somewhat reducing the needed supervision and oversight, but this is countered by increased costs mandated by working around on-going plant activities. The proposed change in the cleanup levels would remove about 1,100 cubic yards of soil in the accessible areas while the Site is still operational. The remainder of the soil contamination would be remediated when the Site ceases its operations.

Considering the changes that will be made to the selected remedy, DTSC believes the remedy becomes more protective of human health and the environment, complies with Federal, state, and local requirements that are applicable or relevant and appropriate to this remedial action, and is cost effective. Soil remediation in the accessible areas of the plant while it is in operation not only reduces exposure to site workers, but also reduces the potential for erosion into surface water and leaching into underlying ground-water, by infiltration and/or fluctuations in the ground-water level.

ESD REFERENCES

D'Appolonia Consulting Engineers, Inc / IT Corp, May 1984, "Investigation of Chromium in Soil, Ukiah, CA", Prepared for Coast Wood Preserving

Geosystem Consultants, Inc, September 21, 1989, "Remedial Action Plan, Coast Wood Preserving, Inc, Ukiah, CA" (2 Vol, inc Appendices), Prepared for Coast Wood Preserving

H. Esmaili & Assoc, August 1981, "Investigation of Ground Water Pollution at Coast Wood Preserving, Inc Plant Site in Ukiah, CA", Prepared for Coast Wood Preserving

J.H. Kleinfelder & Assoc, November 1982, "Phase II Ground Water Study, Coast Wood Preserving, Inc, Ukiah, CA", Prepared for Coast wood Preserving

Montgomery Watson, May, 1999, "Proposed Amendment to the Remedial Action Plan", Prepared for Coast Wood Preserving

Montgomery Watson, June 4, 1999, "Final Proposed RAP Amendment, Coast Wood Preserving, Ukiah CA", Prepared for Coast Wood Preserving

Montgomery Watson, January 12, 2001, "Combined 2000 Fourth Quarter and Annual Report and One-Year Review of *In-Situ* Chromium Reduction at the Coast Wood Preserving Site, Ukiah, California"

Montgomery Watson, January 15, 2001, "Coast Wood Preserving Second Five-Year Review", Prepared for Coast Wood Preserving

Montgomery Watson Harza, February 19, 2002, "Risk-Based Cleanup Level Development Report", Prepared for Coast Wood Preserving

Montgomery Watson Harza, June 18, 2003, "Results of Accessible Soil Sampling for Chromium and Arsenic Contamination at the Coast Wood Preserving Facility, Ukiah, California", Prepared for Coast Wood Preserving

GLOSSARY

Anions - Negatively charged ions. These may be simple one-element ions such as chloride or complex oxy-anions such as chromate or sulfate

Arsenic - Chemical element (symbol As) with Atomic Number 33. It frequently reacts with oxygen to form complex oxy-anions arsenite or arsenate.

Atomic Number - The charge on the nucleus of an atom.

Cations - Positively charged ions, usually a metallic element such as copper.

Chromium - Chemical element (symbol Cr) with Atomic Number 24. The hexavalent form reacts with oxygen to form complex oxy-anions chromate or dichromate. The trivalent form reacts with hydroxide ion to form chromium hydroxide solids.

Copper - Chemical element (symbol Cu) with Atomic Number 24. Commonly occurs as a cation.

CWP - Coast Wood Preserving, Inc.

DTSC - California Environmental Protection Agency, Department of Toxic Substances Control.

Elements - Substances in which all the atoms have the same positive charge on the nucleus. Examples include oxygen, sulfur, chromium, and arsenic.

EPA - United States Environmental Protection Agency.

ESD - Explanation of Significant Differences.

Fixation - A number of processes, such as adsorption, which tend to immobilize chemicals.

Hexavalent - Having a charge of six on an ion. Chromium is hexavalent in the oxy-anion chromate, and sulfur is hexavalent in the oxy-anion sulfate.

In Situ - Activities which occur in place, without excavation or other removal of soil.

Ions - Charged particles consisting of elements or combinations of elements.

Mg/kg - Milligrams per kilogram, a unit of concentration used for solid samples. It is equal to parts per million.

MWH - MWH, Inc, a consulting firm formed by the merger of Montgomery Watson, Inc and Harza Engineering. A consultant to CWP and developer of the *in-situ* remediation process.

Oxy-anion - a complex anion formed by the combination of a cationic element such as chromium and oxygen as a negatively charged particle. The chromate oxy-anion has the formula $(CrO_4)^{-2}$.

RAP- Remedial Action Plan.

Reduction- A chemical reaction involving the gaining of electrons. In the reduction of hexavalent chromium to the trivalent form, the chromium gains three electrons per atom.

RWQCB- Regional Water Quality Control Board, State of California.

Trivalent- Having a charge of three on an ion. Chromium is a trivalent cation in the naturally-occurring chromium hydroxide.

Anuncio

Si prefiere hablar con alguien en español acerca de ésta información, favor de llamar a Jacinto Soto, Departamento de Control de Substancias Tóxicas. El número de teléfono es (510) 540-3842.

For More Information

If you would like more information about the Site, please call Patrick Lee, at (510) 540-3847 or Rachelle Maricq, DTSC Public Participation Specialist, at (510) 540-3910.

Information Repositories

This ESD and the negative declaration, which are part of the Administrative Record for the site, as well as other documents relating to the Site are available for public review at the following locations:

DTSC File Room
700 Heinz Avenue
Berkeley, CA 94710
(510) 540-3800

Mendocino County Library
105 N. Main Street
Ukiah, California 95482
(707) 746-4491

Notice to Hearing Impaired Individuals

TDD users can obtain additional information about the Site by using the California State Relay Service (1-888-877-5378) to reach PPS at (510) 540-3910.

Rachelle Maric
Department of To ic Substances Control
700 Heinz Avenu
Berkeley, California 9471 -2721